PATENT APPLICATION PAPERS

OF

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FOR: METAL SUB-PURLIN AND METAL TRUSS CAP FOR USE IN ROOF CONSTRUCTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention provides a metal purlin and truss cap for wood roofs having steel framing.

2. Description of the Prior Art

As noted in U.S. Patent No. 5,499,480 to Bass, the construction industry has attempted to reduce the use of wood in residential and light commercial developments. This, in turn, will reduce the construction costs, minimize the types of maintenance problems associated with wood, such as insect damage and decay and also significantly reduce the potential damage caused by fire.

A steel framing design for use with wood roofs has been available in the roofing industry for a number of years. In one system, open web steel joists and joist guides are joined with sheathing, thus utilizing the economy and strength of open web steel joists and joist guiders with the low insulation costs and high diaphragm (shear) capacities of a conventional panelized wood roof. In this type of system, sub-purlins, stability braces and roof decking are connected to the joists with its pre-attached wood nailer while all are on the ground.

The conventional wood nailer is attached to the top chord of the open web stud joist so that the wood sub-purlins and decking are connected by standard nailing techniques.

Although the panelized roof system described hereinabove provides significant advantages over commercial roofing systems comprised almost entirely of wood, the

steel framing design still utilizes wood nailers and wood sub-purlins with the attendant disadvantages as noted hereinabove. In addition, the shear strength of a roof system having wood components is limited.

What is therefore desired is to reduce the number of wood components utilized in a steel based, commercial roofing system.

SUMMARY OF THE INVENTION

The present invention provides a steel sub-purlin for use in roof construction whereby the use of wood is reduced, the structural strength of the roof significantly increased and the ability of the roof system to resist shear forces, such as that produced by earthquakes, is increased.

The sub-purlin of the present invention is fabricated using metal roll forming techniques and is shaped to have an upper, angled portion, a lower angled portion, a vertical section connecting the upper and lower sections and vertical extensions from said upper and lower angled portions being positioned in contact with the vertical section.

A truss cap is also provided that replaces the wood nailer.

The present invention thus provides two steel, cold formed components that significantly enhance the shear strength of roofing structures while reducing the disadvantages associated with using wood roofing components.

DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention as well as other objects and further features thereof, reference is made to the following description which is to be read in

conjunction with the accompanying drawing therein:

Figure 1 is a simplified perspective view illustrating a metal roof construction using the sub-purlin and truss cap components of the present invention;

Figure 2a and 2b is a front elevational view and a top plan view, respectively, illustrating the sub-purlin used in the present invention; and

Figure 3 is a front elevational view illustrating the truss cap used in the present invention.

DESCRIPTION OF THE INVENTION

Referring now to Figure 1, a partial perspective view of a frame construction of a panelized roof system 8 using the sub-purlin of the present invention is illustrated.

The construction is conventional for the most part except for the use of steel sub-purlins 10 and steel truss caps 12. The conventional portion of the construction comprises sheathing panel 14, lower steel truss joists 16, upper steel truss joints 17, braces 18, columns 19, and joist braces 21. Sheathing panel 14 is fastened to the top, or upper, surface 56 of the truss cap 12 using metal fasteners, such as metal screws; this eliminates the need for a conventional wood nailer.

Figure 1a is a side view showing sub-purlin 10 fastened to truss cap 12.

Referring to Figures 2a and 2b, sub-purlin 10 of the present invention is illustrated in more detail.

Sub-purlin 10, preferably fabricated using a metal roll forming process, comprises an upper portion 20 having angularly extending sides 22 and 24, portion 24 continuing

into fold over extension 25, connecting vertical portions 26 and 28, and horizontal top surface portion 30. An alignment groove 32 is formed on the top surface portion 30 to guide and align the nail point. Sub-purlin 10 further comprises a lower portion 40 having angularly extending portions 42 and 44, vertical portions 46 and 48 and horizontal lower surface portion 50. As shown in Figure 2b, sub-purlin 10 includes tab, or lip, portions 52 and 54 which enables the sub-purlins to be fixedly positioned on the upper surface 56 of truss cap 12.

A front elevational view of truss cap 12 is illustrated in Figure 3, truss cap 12 comprising upper surface 56, vertical portions 58 and 60 and horizontal edge portions 62 and 64.

Typical dimensions of a sub-purlin 10 that has been successful used in system 10 are as follows (dimensions in inches):

a = 3.50
b = 0.75
c = 1.50
d = 1.42
e = 0.68
f = 0.20
g = 0.50
h = 0.50
i = 0.41
j = 93.50
k = 0.75
l = 1.25

The sub-purlin 10 is preferably fabricated from 20 gauge galvanized steel (the grade of steel and steel thickness (gauge) varies in accordance with the roof load). Using a sub-purlin made of metal improves the overall fire resistant capability of the structure, improves roof shear, reduces construction time and eliminates two layers required for a conventional sub-purlin.

Typical dimensions of a truss cap 12 that has been successfully used in system 10 are as follows (dimensions in inches):

a = 2.50
b = 3.50
d = 5.12

The truss cap 12 is preferably fabricated from 16 gage galvanized steel the upper steel truss joist 17 being connected to horizontal edge portions 62 and 64 with steel pins.

The use of a metal truss cap 12 eliminates the need of a wood nailer which, in turn, eliminates the need for drilling holes to accept the conventional wood screws. Further, the use of a metal truss cap allows the sheathing panel 14 to be installed on the metal truss cap 12 using a heavy industrial gun to insert large metal screws, thus reducing manufacturing cost and construction times. It should be recognized, however, that the roof construction of the present invention can be used with sub-purlins 10 and wood nailers which would be part of a conventional truss joist.

The sub-purlins, truss cap and sheathing panel roof components shown in Figure 1 is first assembled on the ground, hoisted above the columns and joist guiders and then secured to the columns and joist guiders in a conventional manner.

While the invention has been described with reference to its preferred embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the true spirit and scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from its essential teachings.